

WARNING

This material has been reproduced and communicated to you by or on behalf of *Charles Darwin University* in accordance with section 113P of the *Copyright Act 1968 (Act)*.

The material in this communication may be subject to copyright under the Act.
Any further reproduction or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice



Charles Darwin University

Final Examination

Family Name						
Given Name/s						
Student Number						
Teaching Period	Semester 1, 2018					

PHA411 – Therapeutics C	DURATION	
	Reading Time:	10 minutes
	Writing Time:	180 minutes
INSTRUCTIONS TO CANDIDATES		
<p>The examination has THREE (A, B and C) Sections:</p> <p>Section A: Multiple Choice Questions: Answer ALL forty (40) questions on the College 100-MCQ Answer Sheet provided. Total marks allocated: Forty (40). Suggested allocated time: 60 minutes</p> <p>Section B: Extended Answer Questions: Answer any 4 out of 5 questions. Marks as indicated by lecturer. Total marks allocated: Forty (40). Suggested allocated time: 60 minutes.</p> <p>Section C: Case Study Questions: Answer ALL (2) questions. Total marks allocated: Forty (40). Suggested allocated time: 60 minutes</p>		
EXAM CONDITIONS		
<p><u>You may begin writing from the commencement of the examination session.</u> The reading time indicated above is provided as a guide only.</p>		
This is a CLOSED BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
ADDITIONAL AUTHORISED MATERIALS	EXAMINATION MATERIALS TO BE SUPPLIED	
No additional printed material is permitted	1 x 8 Page Book 1 x 20 Page Book College Multiple Choice Answer Sheet	

THIS EXAMINATION IS PRINTED
DOUBLE-SIDED.

THIS PAGE HAS BEEN INTENTIONALLY
LEFT BLANK.

Section A

Section B

Extended Answer Questions

Total No of Marks for this section: 40

This section should be answered in the Answer Booklet provided.

Answer any FOUR (4) questions only.

Marks for each question are indicated. Suggested Time allocation for Section B: 60 mins

Question 1

Caroline is a 32 year-old Aboriginal Liaison Officer at the local hospital. She has been trying to conceive for 16 months without any luck, and presents at the pharmacy requesting a treatment for vaginal thrush. She tells you this is her third episode of thrush in the last 5 months. She is hirsute and has a BMI of 31.5kg/m². You suspect she is displaying signs of polycystic ovarian syndrome (PCOS).

- (a) Explain her signs and symptoms and how these relate to PCOS.

(Marks: 4)

- (b) Give TWO diagnostic criteria for PCOS.

(Marks: 2)

- (c) What treatment options are available to her, and what desired effect will these have on her condition, given that she is trying to conceive?

(Marks: 4)

Question 2

- a) Discuss the pathophysiology and clinical presentation of benign prostatic hyperplasia (BPH). Include in your answer a description of how BPH is diagnosed.

(Marks: 6)

- b) Describe the mechanisms of action of TWO (2) different classes of therapeutic agents available for the symptomatic relief or treatment of BPH, with an example of each.

(Marks: 4)

Question 3

Eloise is a 48 year-old woman seeking some advice on “the change of life”. For the past few weeks she has been experiencing hot flushes several times throughout the day, and is sleeping very poorly as a result of waking in a “pool of sweat”. Eloise has had a levonorgestrel IUD in place for 2 years as a means of contraception, and the last time she had a period (“they normally only last 2 days since I’ve had the IUD”) was 6 months ago. She is feeling quite emotional and teary and wants to know if she should be using hormone replacement therapy (HRT). She has no history of cancer, is a non-smoker, takes Ramipril 5mg daily for blood pressure control and thyroxine for hypothyroidism.

- (a) Based on her history and symptoms, at what stage of menopause is Eloise? Explain.
(Marks: 3)
- (b) Is Eloise a candidate for HRT? Explain why/why not and if so what hormonal formulations would be suitable, with an explanation for your choice.
(Marks: 4)
- (c) Eloise wants to know if she can have her IUD removed if she starts HRT. Comment on this and explain your reasoning.
(Marks: 3)

Question 4

- (a) Identify FOUR (4) risk factors for the development of lung cancer.
(Marks: 2)
- (b) Name the TWO (2) broad categories of lung cancer and how their diagnosis is defined.
(Marks: 2)
- (c) Compare and contrast these 2 categories of lung cancer, including the doubling time, prognosis, staging and treatment options.
(Marks: 4)
- (d) Comment on the value of population based screening for early detection of lung cancer.
(Marks: 2)

Question 5

A 45 year-old woman has been recently diagnosed with advanced ovarian cancer. Following extensive staging and de-bulking surgery, she is due to commence her first cycle of carboplatin (IV) + paclitaxel (IV) (6 cycles at 21 day intervals). In addition to her chemotherapy, she has been prescribed the following treatment protocol;

Cycle 1 and further cycles

Day before chemotherapy		
Dexamethasone 4mg tablets	20mg (oral)	The night before chemo with or after food
Ranitidine 150mg tablets	150mg (oral)	The night before chemo
Day 1		
Palonosetron 0.5mg/Netupitant 300mg combination capsule	0.5mg/300mg (oral)	60 minutes before chemo
Dexamethasone 4mg tablet	12mg (oral)	60 minutes before chemo
Ranitidine 150mg tablet	150mg (oral)	60 minutes before chemo
Loratadine 10mg tablet	10mg (oral)	60 minutes before chemo
Day 2 to 4		
Dexamethasone 4mg tablet	8mg (oral)	ONCE a day (or in divided doses) with or after food

(a) Identify the TWO (2) indications for this range of drug therapies (additional to her chemotherapy).

(Marks: 2)

(b) Match the list of medications with these TWO (2) indications. Include in your answer the drug classes (*e.g. β -blocker*), why they are deemed to be of benefit to this patient and why several medications are used to manage only two indications.

(Marks: 6)

(c) Explain why suspected ovarian cancer is diagnosed surgically and not by partial tissue biopsy.

(Marks: 2)

End of Section B

Section C
Case Study Questions
Total Number of Marks for this section: 40

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested Time allocation for Section C: 60 mins

Question 1 (20 marks)

JD, a 53 year old man, presents to his general practitioner (GP) with lower back pain that has increased over the last month, and fatigue. He has been using over-the-counter diclofenac for his back pain but with little benefit. Further tests reveal a compression fracture in his lumbar spine, haemoglobin of 85g/L (normal 130-180), platelets of $140 \times 10^9/L$ (normal 150-400) serum calcium of 3.2 mmol/L (normal 2.1 -2.6) and serum creatinine of 165 μ mol/L (normal 60-120). Results from a 24 hour urinalysis show 5.2g total protein with 77% Bence-Jones proteins. A bone marrow biopsy confirms a diagnosis of multiple myeloma.

- (a) Briefly discuss the pathophysiology of multiple myeloma, including information that the bone marrow biopsy would highlight. (*hint: what cells does multiple myeloma manifest in?*)
(Marks: 4)
- (b) The acronym **CRAB** is used to describe common presenting symptoms of multiple myeloma. What sign/symptom does each letter represent, and discuss if JD is exhibiting these?
(Marks: 4)

A decision is made to start JD on the induction regimen of thalidomide and dexamethasone as he is a potential candidate for autologous haematopoietic stem cell transplantation (HSCT).

- (c) Define HSCT and discuss the differences between autologous and allogeneic stem cell transplantation.
(Marks: 3)
- (d) What is the purpose of using thalidomide and dexamethasone as induction therapy?
(Marks: 3)
- (e) Suggest THREE (3) additional supportive therapies/agents (*hint: to manage his presenting symptoms*) and explain how they may be useful in managing JD's condition.
(Marks: 6)

Question 2 (20 marks)

Mrs WD, a 63 year-old female of Asian heritage presented to the emergency department of her local hospital following a week of severe nausea and vomiting, abdominal pain and cramps. She had attended an after-hours medical centre four days prior, and the general practitioner (GP) on duty had prescribed antibiotics, which had failed to resolve her symptoms. When her symptoms first began, WD also had several episodes of non-watery diarrhoea, but she had not been able to open her bowels (pass faeces) for 5 days since then.

She appeared fatigued and in distress when she presented to the hospital for further examination. She had a 7cm×10cm tender and palpable mass on the left upper quadrant (LUQ) of her abdomen and her imaging tests (X-ray and CT scan) results revealed a severe obstruction in her descending colon due to the presence of a solid mass with bowel wall invasion. Hepatomegaly was also noted and her bowel sounds were very weak.

Mrs WD's other medical conditions included type 2 diabetes, mild hypertension, dyslipidaemia, osteoarthritis, suspected haemorrhoid (self-diagnosed) and anaemia which was noted approximately 4 months ago by her regular GP.

Mrs WD (165cm in height and 89kg in weight) had 2 children, both in their late 20s. She smoked cigarettes briefly when she was in her early 30s but gave it up when she was pregnant with her first child. She claimed to have lost 8kg over the past 12 months.

Mrs WD's medications on admission included:

Atorvastatin 40mg tablet	1 daily
Irbesartan 75mg tablet	1 daily
Metformin XR 1000mg tablet	1 daily
Gliclazide-MR 60mg tablet	2 daily
Paracetamol 500mg tablet	2 twice daily when required
Pantoprazole 40mg tablet	1 daily
Docusate + sennosides tablet	1-2 night when required

Mrs WD's family medical histories included:

- Father passed away from bowel cancer 20 years ago
- Mother passed away from a heart attack 10 years ago
- Older brother with diabetes
- Maternal aunt breast cancer survivor

Mrs WD underwent an emergency colon resection. Several adenomatous polyps were found in the resected colon and the tissues taken from the area causing her bowel obstruction were identified as "carcinoma". Mrs WD was subsequently diagnosed with Stage IIIC colon cancer.

- (a) What are the known risk factors for colorectal cancer? Which of these risk factors are applicable to Mrs WD?

(Marks: 4)

(b) What screening tests are available for early detection of colorectal cancer? From where could Mrs WD have accessed these?

(Marks: 2)

(c) Given that Mrs WD has been diagnosed with Stage IIIC colon cancer, what is the goal of treatment, and why?

(Marks: 2)

Adjuvant chemotherapy of **FOLFOX** (5-fluorouracil, leucovorin—also known as folinic acid, and oxaliplatin) was administered. Despite completing six cycles of adjuvant chemotherapy, Mrs WD's disease progressed and a CT scan revealed metastases to her liver. She was commenced on **FOLFIRI** (leucovorin, 5-fluorouracil and irinotecan) and underwent testing for *K-RAS mutation* in order to determine the suitability of a targeted therapy. The results indicated WD was positive for *K-RAS mutation*.

(d) Describe the mechanisms of action of the THREE (3) chemotherapeutic agents used to treat Mrs WD's metastatic colon cancer (**FOLFIRI**). Include in your answer TWO (2) toxicities of each agent.

(Marks: 6)

(e) Comment on the suitability of the targeted therapies, bevacizumab or cetuximab as additional therapy to the chemotherapy for Mrs WD. Include in your answer the target sites for bevacizumab and cetuximab, and the mode of action of each of these agents.

(Marks: 4)

(f) If Mrs WD's results indicated she was *K-RAS wild type*, would the suitability of bevacizumab or cetuximab change for her? Explain.

(Marks: 2)

End of Section C

End of Exam Paper